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Section B

Financial Statement
Preparation and Analysis





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Section B: Financial Statement Preparation and Analysis (25%)

Study Unit 21: B.1. Asset and Liability Valuation

Valuation of Accounts Receivable

For financial statement presentation, short-term receivables are valued and reported at the **net amount expected to be collected**, also called the **net realizable value**. The amount of consideration a company expects to receive from an individual customer in exchange for transferring goods or services is the **transaction price**. The net amount the firm expects to receive in cash may be different from the amount legally receivable at any given time due to future returns and allowances, and credit losses on receivables.

Therefore, determining the net amount expected to be collected on accounts receivable involves estimation of expected credit losses on receivables.

Credit Losses on Receivables

Note: Guidance in the *Accounting Standards Codification®* on accounting for credit losses on financial instruments, including trade receivables, is in ASC 326.

Unfortunately, some of a company's receivables will not actually be collected. A credit loss may occur on a receivable because a customer goes bankrupt, an amount is disputed, or the customer simply fails to pay for some other reason. Because an asset recorded on the balance sheet should reflect the amount of future benefit the company expects to receive, it is essential that a company makes sure that its assets are not overstated. The company accomplishes this by **valuing the receivables** at each reporting date by estimating the balance of outstanding receivables that it will be able to collect in the future. This expected amount is what the company should present on the balance sheet.

A valuation account, Allowance for Credit Losses-Trade Receivables, is used to report the portion of the receivables that management estimates will **not** be collectible. The valuation allowance decreases the carrying amount of the receivables on the balance sheet in recognition of the fact that not all of them will be collected as cash. Thus, the allowance account should always have a negative (credit) balance, and, when combined with the gross accounts receivable account (which carries a positive, or debit, balance), the valuation account serves to decrease the value of net accounts receivable reported on the balance sheet.

The valuation account usually follows the accounts receivable account in the general ledger. The positive accounts receivable account balance and the negative valuation account balance combined equal the receivable amount estimated to be collectible. The estimated collectible amount is called "net receivables" and usually only the net receivables amount is presented on the balance sheet.

The estimate must be updated at each reporting date. A related credit loss expense is recorded in net income and is equal to the amount needed to adjust the allowance account to management's current estimate of expected credit losses on the financial assets.[64]

Because the allowance account is a valuation account, it is used to reduce the balance of receivables shown on the balance sheet (similar to the way accumulated depreciation reduces fixed assets). Therefore, the allowance account must carry a credit balance because it is not likely that a company will collect **more** from its customers than the customers owe them. If the details of the net accounts receivable are presented on the balance sheet, they will be presented as follows:

Accounts receivable	**$100,000**	
Less: Allowance for credit losses	**3,750**	**$96,250**

[64] Per ASC 326-20-30-1.

The $96,250 is the net accounts receivable, that is, gross accounts receivable less the allowance for credit losses-trade receivables.

Calculating and Recognizing the Expense and Allowance

At the end of each period a journal entry needs to be made to record the current expected credit loss expense for the period. Credit loss expense-trade receivables is debited and the allowance for credit losses-trade receivables account is credited. The journal entry is:

Dr Credit loss expense-trade receivables X
Cr Allowance for credit losses-trade receivables X

The allowance account is in essence a holding account. The company's management knows that some customer is not going to pay, but since they do not yet know which customer that is, management is not able to credit (reduce) any specific customer's receivable account to write off the credit loss. Therefore, the expected credit loss is "held" in the allowance account until time passes and the company knows which customer will not be paying.

The amount that is recorded as the credit loss expense is usually calculated as a % of the credit sales during the period. The company will use previous periods to estimate what % of their credit sales are not collected, and will use this to estimate the amount of current period credit sales that will not be collected.

Example: If the company had $300,000 of credit sales and historically 2% of credit sales are not collected, they would need to recognize a credit loss expense of $6,000, calculated as 2% of $300,000.

The journal entry to record this would be:

Dr Credit loss expense-trade receivables $6,000
Cr Allowance for credit losses-trade receivables $6,000

Valuation of Inventory

Valuing the Inventory When It Is Purchased

Inventory should be recorded in the books at an amount that includes **all the costs paid for the inventory and for getting the inventory ready and available for sale**. Costs include the cost of the inventory, shipping costs to receive the inventory, insurance while the inventory is in transit, taxes and tariffs, duties, and any other costs without which the company could not receive the inventory to sell to the customer. Costs of receiving the inventory are called **landing costs**.

The journal entry to record the purchase of inventory is as follows:

Dr Inventory.. all costs required
Cr Cash.. all costs required

Note: If more than one type of inventory is purchased for only one purchase price, the cost needs to be allocated among the different inventories purchased using a pro rata distribution based on the **fair values of the different items purchased**.

If a company receives **any discounts** related to the purchase of the inventory, the **discounted price it pays** is the amount that should be recorded as the value of the inventory.

In-Transit Goods

It is possible that at the end of the year there are some shipments of inventory that have been shipped, but not yet received. This can relate to inventory that the company is purchasing for use in its operations, or finished goods inventory that it has sold to the customer. For these goods in-transit at the end of the year, it must be determined who the goods belong to, and therefore, which company should record the goods as inventory on their balance sheet. The owner of the goods is determined by the terms of shipping.

- Goods sent **FOB Shipping Point** belong to the buyer from the moment the seller gives them to the shipping company. Thus, while the goods are in transit they belong to the buyer because title was transferred at the shipping point. Therefore, goods that have been shipped FOB Shipping Point by the end of the period should be included in the buyer's ending inventory even though the buyer may not have received them by the end of the period. The goods should not be included in the seller's ending inventory.
- Goods sent **FOB Destination** belong to the seller until the buyer receives them. While the goods are in transit, they belong to the seller and title is transferred at the destination point only when the buyer receives them. Goods shipped FOB Destination near the end of the period that have not been delivered to the buyer by the end of the period should be excluded from the ending inventory of the buyer and included in the ending inventory of the seller.

Calculating Cost of Goods Sold

Cost of goods sold represents the cost to produce or purchase the units that were sold during the period. It is perhaps the largest individual expense item on the income statement, so it is important for cost of goods sold to be calculated accurately. The beginning and ending inventory balances are used in this calculation. This makes the valuation of inventory a critical part of the profit calculation for the company.

Cost of goods sold is calculated using the following formula:

	Beginning inventory
+	Purchases during the period
−	Ending inventory
=	Cost of goods sold

The formula above is a simplification of what is actually occurring because it assumes that all the units in finished goods inventory at the beginning of the period were either sold during the period or were still in finished goods inventory at the end of the period, which does not always happen. In reality, some units may be damaged, stolen or lost. However, for the FMAA exam, the above formula is sufficient.

Note: All units of inventory that the company has during the period must be in either ending inventory or be transferred to cost of goods sold. We will see this in the examples later in this topic.

Determining Which Item Is Sold: Cost Flow Assumptions

Because the inventory on hand that a company holds is purchased at different times, the prices paid for individual units of the same item are different. The cost of the specific unit of inventory that is sold impacts both the balance sheet (through reduction of the inventory account) and the income statement (through increase of the cost of goods sold).

Therefore, the company must have a method of determining exactly which unit of inventory is sold for each and every sale. The company must essentially determine if the sold unit was the oldest in inventory (that is, purchased a long time ago), the newest unit (the most recently purchased), or some "average" unit of inventory.

The different methods for determining which units have been sold are called **cost flow assumptions**. The four main cost flow assumptions are:

1) **First in First Out (FIFO)**, in which it is assumed that the item sold to the customer is the earliest unit purchased by the seller that has not yet been sold (that is, the oldest item in inventory).

2) **Last in First Out (LIFO)**, in which it is assumed that the item sold to the customer is the latest unit purchased by the seller (that is, the newest item in inventory).

3) **Average Cost**, in which the costs paid for all the individual units of a given item in inventory are summed and divided by the number of units purchased to find the average cost for each unit.

4) **Specific Identification**, in which each unit of inventory is individually tracked. The specific identification method is used for low quantity, high value inventory items, such as merchandise in a jewelry store or serialized electronic merchandise where inventory records are kept by serial number.

IFRS Note: Under IFRS, **LIFO** is **prohibited**.

Note: For the FMAA exam, only FIFO and LIFO are tested.

Whichever cost flow assumption is used, the resulting cost of a sold unit becomes the cost used as the cost of goods sold for that sale.

1) First in First Out (FIFO)

Under FIFO, the most recently purchased inventory items are included in ending inventory on the balance sheet. The assumption is that the oldest item in inventory is always the item sold, whether or not that is actually what happens. In addition, it is assumed the most recently purchased items are still in inventory at the end of the period.

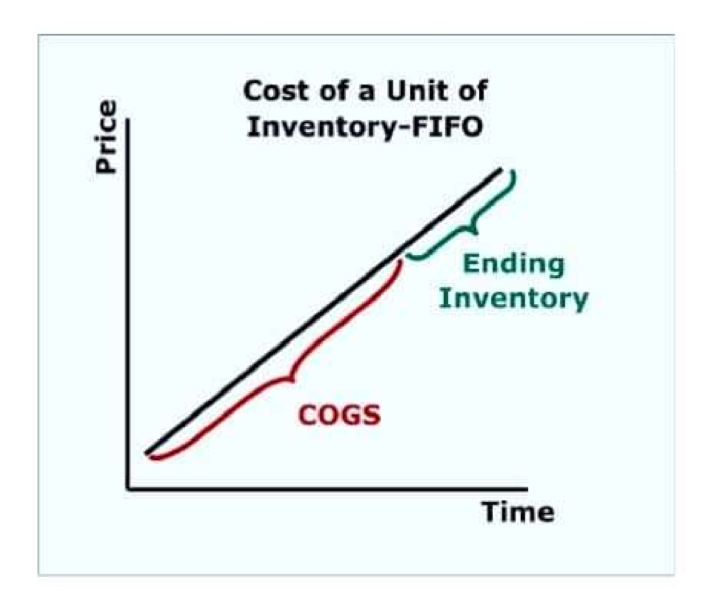
An example of the FIFO method is a fruit stand. When someone buys an apple, the seller will try to sell the oldest apple first because if it spoils before its sale it will become "obsolete," creating a loss for the fruit stand.

However, unless inventory is highly perishable as apples are, it does not matter whether or not the **actual** earliest item stocked is the item sold. Whether it is or not, the **assumption** is made that the earliest item stocked is the item sold each time a sale occurs.

In a period of rising costs, using FIFO will result in a **higher ending inventory** balance and a **lower COGS** (and therefore **higher operating income**) when compared to LIFO, which will be covered next. This occurs because the newest, highest-cost units of each inventory item are still on hand at year-end (higher ending inventory) and the oldest, lowest-cost units of each inventory item were sold during the year (lower cost of goods sold).

> **Note**: Under FIFO, ending inventory is essentially valued at current cost (or replacement cost), and cost of goods sold is reported at an older, historical cost. Therefore, the balance sheet has "current" figures because the inventory is valued at the more current costs.

In a period of rising prices, FIFO looks like the following:



2) Last in First Out (LIFO)

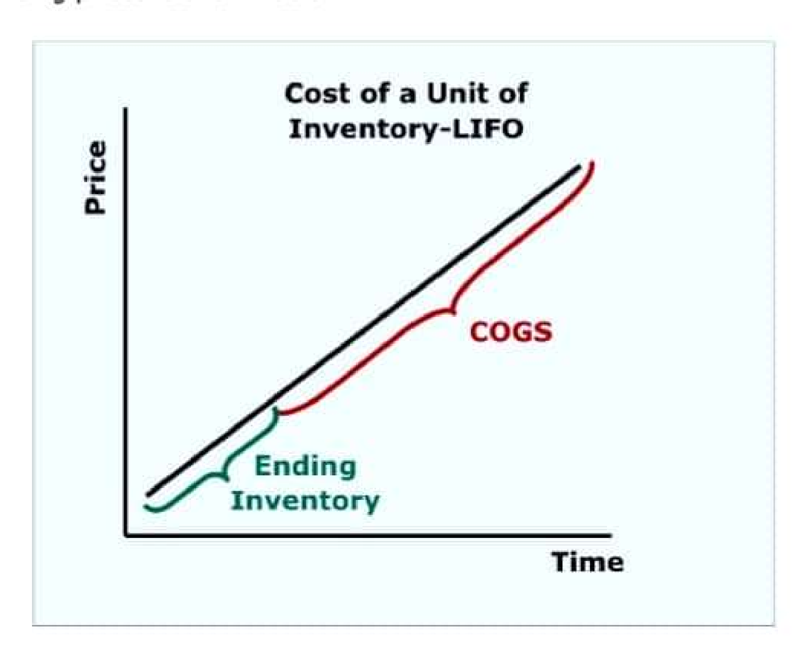
When LIFO is used, the assumption is made that each time a unit is sold it is the one that was purchased most recently—the newest item in inventory. Therefore, the oldest inventory items (and the lowest-cost items, assuming rising prices) will be included in ending inventory on the balance sheet.

In a period of rising prices LIFO will create a **lower ending inventory** balance and a **higher COGS** (and therefore **lower operating income**) when compared to FIFO. At year end, the oldest, lowest-cost items are still in inventory and the newest, highest cost units have been sold and are expensed on the income statement as cost of goods sold.

The LIFO inventory method can be compared to an elevator. Assume a crowd of people stepping onto an elevator and heading to the same floor together. The last person who steps on is often the first person stepping off because that person is closest to the door.

> **Note**: Under LIFO, cost of goods sold is valued at the current cost (or replacement cost) of the inventory. Inventory is recorded on the balance sheet at an older, historical cost. Therefore, the income statement has "current" figures on it because cost of goods sold is valued at the current costs.

LIFO in a period of rising prices is shown below:



Whenever a sale takes place, the newest, highest-cost item of inventory is considered sold and is reported as cost of goods sold expense while the oldest, lowest cost unit is assumed to remain in ending inventory.

Example: Below are the March inventory purchase and sales transactions for Medina Company. Note that prices are rising.

		Units	Cost Per Unit
	Beginning Inventory	1,000	$5.00
March 3	Purchase	1,500	6.00
March 7	Sale	900	
March 11	Sale	700	
March 20	Purchase	1,000	7.00
March 21	Sale	600	
March 29	Sale	200	
	Ending Inventory	1,100	

Calculate the ending inventory and COGS using the FIFO and LIFO methods.

Before answering these questions, it is useful to look at the number of units the company had available for sale during the period and determine how many were sold (and will be in cost of goods sold) and how many units are in ending inventory.

The number of units sold is 2,400. The company had 3,500 units available to sell during the period (the 1,000 units in beginning inventory plus the 2,500 units purchased), and ending inventory contains 1,100 units. Therefore, 2,400 units must have been sold (3,500 − 1,100). The units sold in each of the four individual sales during the month can also be summed: 900 + 700 + 600 + 200 = 2,400.

The total value of goods available for sale during the month is $21,000: (1,000 × $5) + (1,500 × $6) + (1,000 × $7). The total of ending inventory and cost of goods sold must therefore be $21,000 under all methods. When one of those amounts (inventory or cost of goods sold) is known, the other can be determined by looking at the difference between the total goods available for sale (here, $21,000) and the known amount, as shown in the explanations below.

FIFO

When FIFO is being used, it is usually easier to calculate ending inventory. Once ending inventory is calculated, subtract the ending inventory from the total cost of all units available for sale, which in this example is $21,000, to calculate COGS. Since 1,100 units are in ending inventory and FIFO is being used, the units in ending inventory are the units most recently purchased. Therefore, ending inventory consists of 1,000 units that cost $7 each and 100 units that cost $6 each for a total of **$7,600**. If ending inventory is $7,600, then the COGS sold is **$13,400** ($21,000 − $7,600).

LIFO

The values of ending inventory and COGS can be calculated in a manner very similar to the FIFO periodic method, except that the 1,100 units in ending inventory are the oldest units purchased. Thus, ending inventory includes 1,000 units that cost $5 each and 100 units that cost $6 each, which equals **$5,600**. If ending inventory is equal to $5,600, then COGS is equal to **$15,400** ($21,000 − $5,600).

Note: A company may make the calculation of the newest or oldest good either each time that an inventory transaction takes place, or they may do it at the end of the period. When it is done after each inventory transaction, it is called the **perpetual method**. When it is done at the end of the period, it is called the **periodic method**. The calculations are the same under both methods, but they are done more frequently under the perpetual method. Any calculations on the exam will be using the period method.

Valuation of Property, Plant and Equipment (Fixed Assets)

Property, plant, and equipment—also called fixed or capital assets—includes land, buildings, and equipment acquired for operations and not for resale. Fixed assets are long-term assets that possess physical substance, and they are usually depreciated.

For many companies, "Property, Plant, and Equipment" constitutes the largest asset classification on the balance sheet, especially for production companies with large production facilities. Therefore, it is an important that the company correctly value and account for fixed assets.

Initial Recording of the Fixed Asset

Fixed assets should be initially recorded in the accounting records at historical cost, which is the amount paid for the **asset and all other costs necessary to get the asset ready for use**.

It is important to be familiar with the costs included in the different classes of fixed assets. Below are some of the major classifications of assets and the items specific to each classification.

- **Buildings**. The purchase price, costs of renovating or preparing the building, cost of permits, any taxes assumed by the purchaser, insurance paid during the construction of the building, and materials, labor, and overhead of construction.
- **Machinery and equipment**. The cost of the machine, freight-in, handling, taxes, testing the machinery, installation, and any other costs of getting the machinery ready for its intended use. Partial destruction of property can be included if, for example, a wall needs to be torn down to install machinery onto a factory floor. If a wall needs to be torn down to install the machinery, the costs of the demolition and rebuilding the wall are included in the cost of the machinery.
- The cost of **improvements** made to equipment after its acquisition should be added to the asset's historical cost if the improvements will provide future benefits.
- **Land**. The land purchase price, including any mortgages the purchaser assumed, transaction costs, site preparation costs, the costs of purchasing and razing (destroying) an existing structure, the amount of any delinquent real estate taxes assumed by the purchaser, permanent improvements, and other costs necessary to prepare the land for its intended use. The costs of destroying an existing building are included in the land cost because the land is not ready for its intended use until the building is removed.

  Any proceeds from the sale of an asset resulting from preparing the land for use should be treated as a **reduction in the cost of the land**, not income. For example, if trees are cleared and the timber sold, the proceeds from the sale of the wood are accounted as a reduction in the cost of the land.

Depreciation

Depreciation is the systematic and rational allocation of the costs of a fixed asset over its expected useful life. In other words, depreciation matches the cost of acquiring the asset with the revenues the asset will generate over its useful life by spreading the recognition of the acquisition cost over the time period during which the asset will be useful (provide revenue) to the company. Depreciation is a method of cost allocation. It is a purely mathematical process of dividing in some manner the cost of the asset among the periods in which it will be used.

Net Book Value of Fixed Assets

Each year, depreciation is usually recorded by debiting depreciation expense (or an inventory account for manufacturing depreciation) and crediting **accumulated depreciation**. Accumulated depreciation is a valuation account that decreases the carrying value of fixed assets, recorded at their historical cost, to their book value. The book value is the cost of the fixed assets minus the accumulated depreciation. The historical

cost recorded in the fixed asset account at the time of acquisition will remain unchanged until disposal unless subsequent expenditures for that asset are capitalized.

The journal entry to record depreciation expense below has the same form, no matter which depreciation method is used. The calculation that is made for depreciation expense determines the amount that is recorded in the following journal entry:

Dr Depreciation expense (or factory overhead control)[65] x
Cr Accumulated depreciation x

The accumulated depreciation account is presented on the balance sheet as a reduction or valuation of the fixed assets account. In the example that follows, $76,250 is the carrying value or book value of the company's fixed assets.

Fixed assets	$100,000	
Less: Accumulated depreciation	(23,750)	$76,250

Note: The fixed asset account itself is not reduced as an asset is depreciated.

Calculation of Depreciation

Four methods are used to calculate the amount of depreciation to record each period. Some general information is needed before depreciation can be calculated under any of the methods. The needed information and the definitions of the terms are:

- **Estimated useful life**. Also known as "service life," "estimated useful life" refers to the length of time an asset is expected to be useful and the period of time over which depreciation is recognized. At the end of its useful life, the asset should have a book value equal to the estimated salvage value.
- **Estimated salvage value**. Also known as "residual value," "estimated salvage value" refers to the value an asset is expected to have at the end of its useful life. The book value may not be depreciated below the salvage value. However, some companies have an accounting policy that salvage value is always $0.
- **Depreciable amount or depreciable base**. The depreciable base is the amount to be depreciated over the asset's useful life. It is equal to the capitalized amount (that is, the cost of the asset) minus its salvage value.

Note: **Land is never depreciated** because the useful life of land is unlimited.

Depreciation Methods

The annual depreciation charge can be calculated in four main ways. No matter which depreciation method is used, the journal entry on the previous page is the same. The following three methods are simply different ways of calculating the value of "X" in the journal entry.

[65] If the depreciation being recorded is depreciation of manufacturing facilities, the depreciation is a fixed overhead cost and is debited to factory overhead control instead of to depreciation expense. The depreciation becomes a part of the inventory cost of the items manufactured and flows to cost of goods sold along with the other costs of production as the items are sold.

1) Straight-line Depreciation

Straight-line depreciation (STL) results in an equal amount of depreciation taken each period:

$$\textbf{Periodic Depreciation} = \frac{\textbf{Depreciable Base}}{\textbf{Estimated Useful Life}}$$

The **depreciable base** is the asset's initial cost (including all costs required to purchase the asset and make the asset ready for use, such as sales or value-added taxes, shipping-in costs, and installation costs) minus the anticipated salvage value.

Note: Straight-line depreciation is the easiest depreciation method to calculate. As such, it is the depreciation method that will usually appear in questions that include depreciation but are not specifically questions about depreciation.

All other depreciation methods result in greater depreciation in the early years of an asset's life and lesser depreciation in the latter years. All the other depreciation methods are called **accelerated depreciation methods**.

2) Double Declining Balance

The annual depreciation rate in the double declining balance (DDB) method is **two times** the percentage that would be recognized under the straight-line method, but that percentage is applied to the **net book value of the asset at the beginning of each year** instead of to its depreciable base, as in straight-line depreciation.

Example: If the useful life of the asset is 10 years, take a depreciation charge each year equal to 20% of the asset's book value **at the beginning of the year**. Twenty percent is used because 20% is twice the 10% that would have been used each year under the straight-line method.

However, the 20% is applied to the net book value of the asset at the beginning of each year, whereas with straight-line depreciation, the 10% would have been applied to the depreciable base each year.

The annual depreciation to be recorded is calculated as follows:

Double declining rate × **book value of the asset** at the beginning of the year

Note: In the double-declining balance method, the depreciation charge is calculated using the book value **at the beginning of the period**, not the original depreciable base.

Salvage value is not taken into account when calculating the periodic depreciation charge. However, the anticipated salvage value is used. Near the end of the asset's useful life, it is important not to depreciate the asset below its salvage value. **Therefore, the final year's depreciation amount needs to be adjusted so that the asset's net book value after the final year's depreciation has been recorded will be equal to its salvage value**.

Note: Many companies use DDB for the first few years of an asset's life and then switch to straight-line for the remaining years.

Example: A company buys an asset costing $100,000 that has an estimated salvage value of $10,000. The estimated useful life is 4 years.

The depreciable base is $90,000 (calculated as the cost less the salvage value). Given a 4-year useful life, the annual depreciation recorded under the straight-line method would be 25% of the depreciable base. Under the DDB method, the annual depreciation is two times 25%, or 50% of the asset's **beginning book value**. The depreciation charge for Year 1 must be calculated before calculating the depreciation charge for Year 2 in order to know the book value at the beginning of Year 2, and so on.

Year 1: $100,000 book value × 50% = **$50,000** depreciation recorded

Year 2: $50,000 BV ($100,000 − $50,000 depreciation recorded in Year 1) × 50% = **$25,000** depreciation recorded

Year 3: $25,000 BV ($100,000 − $50,000 depreciation recorded in Year 1 − $25,000 depreciation recorded in Year 2) × 50% = **$12,500** depreciation recorded

Year 4: $12,500 BV ($100,000 − $50,000 depreciation recorded in Year 1 − $25,000 depreciation recorded in Year 2 − $12,500 depreciation recorded in Year 3) × 50% = $6,250. **However**, recording the entire $6,250 as depreciation in Year 4 would reduce the asset's book value below its $10,000 salvage value. Thus, the Year 4 depreciation recorded is **only $2,500** ($12,500 BV − $2,500 depreciation = $10,000 BV after the Year 4 depreciation is recorded).

The total depreciation recorded during Years 1 through 4 is $90,000, the amount of the depreciable base ($50,000 + $25,000 + $12,500 + $2,500), and at the end of 4 years the net book value of the asset will be its salvage value of $10,000.

Note: The double declining balance method uses 200% of, or two times, the straight-line amount. Other forms of declining balance depreciation can be used as well, using different percentages such as 150% of the straight-line amount.

Note: With all the other methods of depreciation, the depreciation recorded can be calculated for any year of the asset's life independent of the other, earlier years. However, when the declining balance method is used, to calculate the depreciation recorded for Year 2, for example, it is necessary to first calculate the depreciation recorded for Year 1 in order to know the book value to use in calculating the Year 2 depreciation. And before calculating Year 3's depreciation, depreciation needs to be calculated for Years 1 and 2, and so forth.

In contrast, under the straight-line, sum-of-the-years'-digits and units-of-production methods (the last two are discussed next), depreciation for any year subsequent to the first year can be calculated without first calculating any of the preceding years' depreciation amounts.

3) Sum-of-the-Years'-Digits

In the sum-of-the-years'-digits (SYD) method, the amount of depreciation to be recorded for any given period is calculated using fractions based on the estimated useful life of the asset.

Under the SYD method, the depreciable base (cost less estimated salvage value) is multiplied by a fraction that is determined using the useful life of the asset. The denominator of the fraction is a sum of all of the asset's estimated years of useful life. For example, if the asset has a useful life of 5 years, the denominator is the sum of the useful years: 5 + 4 + 3 + 2 + 1 = 15. The numerator is the number of years remaining in its life, including the year for which depreciation is being calculated. Thus, for a 5-year asset, the depreciation recorded in the first year is 5/15 of the depreciable base. In the second year, the depreciation recorded will be 4/15 of the depreciable base, in the third year 3/15, and so on.

If the number of years is too great to sum easily, the sum-of-the-years'-digits, or the denominator of the fraction, can be calculated using the following formula, where **n** represents the total number of years of useful life for the asset:

$$\textbf{Sum-of-the-Years'-Digits} = \frac{n(n+1)}{2}$$

For example, the SYD to use for the denominator for an asset with a five-year useful life is:

$$\text{Sum-of-the-Years'-Digits} = \frac{5(5+1)}{2} = \frac{5 \times 6}{2} = 15$$

The above sum-of-the-years'-digits can also be achieved through the following summation: 1 + 2 + 3 + 4 + 5 = 15.

Example: A company buys an asset costing $100,000 that has an estimated salvage value of $10,000. The estimated useful life is 4 years.

The depreciable base is $90,000 (calculated as the cost less the salvage value). This depreciable base of $90,000 will be depreciated over the asset's 4-year useful life. With a useful life of 4 years, the sum of the year's digits is 10 (1 + 2 + 3 + 4 = 10). Therefore, in Year 1, the company will record depreciation equal to 4/10 of the depreciable base, or $36,000. The calculation for each of the 4 years is below:

Year 1: $90,000 × 4/10 =	$ 36,000
Year 2: $90,000 × 3/10 =	27,000
Year 3: $90,000 × 2/10 =	18,000
Year 4: $90,000 × 1/10 =	9,000
Total	**$ 90,000**

The total depreciation recorded over the life of the asset is equal to the depreciable base, and the final book value equals the salvage value.

Valuation of Intangible Assets

Except as noted, guidance in the *Accounting Standards Codification®* on accounting for intangible assets is in ASC 350, *Intangibles-Goodwill and Other*. Guidance on accounting for the intangible asset goodwill acquired in a business combination is in ASC 350 and also in ASC 805, *Business Combinations*.

Intangible assets are assets that are not physical or that cannot be touched. The accounting for intangibles is very similar to that for property, plant & equipment with the same issues:

1) Initial recording of the intangible asset

2) Amortization of the cost of the intangible asset (for intangibles, amortization is equivalent to depreciation of tangible assets)

Initial Recording of Intangible Assets

Like fixed assets, intangible assets are recorded at the cost paid to acquire them including expenditures required to make the assets ready for their intended use.

Note: Value attributed to internally generated assets such as patents (other than registration fees and legal fees for filing the patent) or customer goodwill are not recorded on the balance sheet because they do not meet the definition of asset. An asset is something that has arisen from a past transaction. Internally generated value attributed to assets such as patents and customer goodwill did not arise from a past transaction.

Research and development costs are generally expensed as incurred and thus they are not capitalized and amortized. For example, a patent that results from research and development activities would not lead to an asset on the books of the company that developed it, although registration fees and legal fees paid for filing the patent may be capitalized on the balance sheet and amortized.

Amortization and Accounting Treatment of Intangibles

After the intangible asset has been recorded, it must be properly valued as time passes.

- If the asset has a **finite life**—a determinable, limited life—it is amortized over that useful life.

  The amount amortized for a limited-life intangible asset is its cost minus any residual value. However, usually the residual value will be zero unless the intangible asset has value to another company and thus can be sold. The amount of amortization expense recognized each period should be based on the pattern in which the asset will be used up, if that is determinable. When the amortization expense is recognized, the expense should be debited to an amortization expense account and the credit should be either to the appropriate intangible asset account or to a separate accumulated amortization account.

  If the estimated life of a limited-life intangible asset changes, the remaining carrying amount at the time of the change should be amortized prospectively over the revised remaining useful life.

- If the asset has an **indefinite life**, the asset is not amortized, but it must be tested regularly for impairment and written down to its fair value if it is found to be impaired.
- **All** intangibles, including amortized intangibles, should be **evaluated regularly for impairment**. An impairment loss should be recognized if the evaluation indicates that the carrying amount of the intangible asset is not recoverable.

Valuation of Liabilities

Liabilities are present obligations of an entity to transfer or otherwise provide an economic benefit or benefits to others. A present obligation is one that exists at the financial statement date. To be presently obligated, an entity must be bound, legally or in some other way, to pay some amount of money in the future, or perform some sort of service or provide a product in the future.

- A liability may require an entity to pay cash, or it may require the entity to convey other assets including shares, to provide services, or to transfer other economic benefits or to be ready to do so. For example, a receipt of cash creates an obligation if the entity receiving it is expected to provide a good or service or refund the cash if the good or service is not provided by a certain date.
- Liabilities are routinely incurred in exchange transactions to acquire funds (that is, borrow money) or acquire goods and services that an entity needs to operate. A liability may also be incurred by selling products with a warranty or guarantee that obligates the entity to either pay cash or repair or replace any defective products.

Study Unit 22: B.1. Revenue Recognition and Income Measurement

Revenue Recognition

The revenue recognition principle requires revenues to be recognized in the accounting period in which the performance obligation is satisfied. A performance obligation is satisfied when the customer obtains control of the asset, and the asset is the good or service transferred to the customer. Therefore, revenue should be recognized to depict the transfer of goods or services to customers in an amount that reflects the consideration (payment) that the company expects to be entitled to in exchange for those goods or services.[66]

The revenue recognition standard is principles-based rather than rules-based. That means its application will require management judgment regarding how to handle specific situations. However, once the judgments relating to specific situations have been made, they must be applied consistently within and across different units of the company. They may not vary according to the judgment of an individual accountant or operating unit within the company.

The revenue recognition standard includes five steps:

1) Identify the contract with a customer.
2) Identify the separate performance obligations in the contract.
3) Determine the transaction price.
4) Allocate the transaction price to the separate performance obligations in the contract.
5) Recognize revenue **when or as each performance obligation is satisfied**.

A particular transaction may not require all five steps, and the steps may not always need to be applied in the order above. The revenue standard is not organized according to the five steps, but the five steps are provided as a methodology for companies to use to determine how to account for a given transaction.

For most transactions the recognition of revenue is very clear and easy. When there is a simultaneous transfer of cash for the goods or services purchased, revenue is recognized at that time.

The situations in which revenue recognition becomes more complicated includes long-term construction projects like buildings or shipbuilding, and long-term service contracts in which a number of different services need to be provided over a long period of time.

The revenue recognition issues connected to these situations are outside the scope of this exam.

Expense Recognition Practices

The expense recognition principle, commonly called the **matching principle**, states that recognition of expenses is related to net changes in assets and the earning of revenues. Expenses should be recognized during a period that result from transferring control of goods or services to customers and recognizing the associated revenue during that period. Thus, expenses should be recognized when the work or product contributes to revenue. The expense recognition principle is implemented by matching efforts (or expenses) with accomplishments (revenues).

Expenses are recognized based on one of the following three methods:

1) **Cause and effect**: the cost of an item sold is recognized as cost of goods sold when the sale of the item contributes to revenue.
2) **Systematic and rational allocation** such as depreciation, related to net changes in assets.
3) **Immediate recognition**: if an expense will not provide future benefit, it is immediately recognized.

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[66] ASC 606-10-05-3.

Gains and Losses

Gains and losses are two of the elements that make up the income statement (along with revenue and expenses). It is important to remember that gains and losses are the results of transactions that are **NOT part of the company's regular operations**.

- **Gains** are increases in equity resulting from transactions that are not part of the company's main or central operations and that do not result from revenues or investments by the owners of the entity.
- **Losses** are decreases in equity resulting from transactions that are not part of the company's main or central operations and that do not result from expenses or distributions made to owners of the entity.

The difference between revenues and gains and between expenses and losses depends on the company's typical activities. For example, the sale of a product as part of a company's normal operations constitutes revenue. However, the sale of a fixed asset formerly used in the company's operations is not part of the company's regular operations, so the excess of the amount received for the asset over its net book value is a gain, not revenue. If the amount received for the asset is less than its net book value, the deficit is a loss, not an expense.

Gains and Losses on the Disposal of Fixed Assets

One of the most common examples of a transaction that gives rise to a gain or a loss is the disposal of fixed assets. The use of fixed assets is part of the main operations of the company, but the sale (disposal) of fixed assets is not part of why the company exists. Therefore, when a company sells a fixed asset, the difference between the carrying value of the fixed asset and the cash (or fair value of other assets received) will be reported on the income statement as a gain or loss. The gain or loss is the difference between the amount received for the sale and the book value of the fixed asset(s), which is made up of the historical cost less the accumulated depreciation.

Example #1: Archer Company provides contracting services. It owns thirty 8,000-watt generators for construction sites. Management has decided the 8,000-watt generators are insufficient for its needs and has replaced them with new, 12,000-watt generators. The carrying value of the used generators is $40,000, presently recorded in the accounting system as follows:

Equipment (cost)	$65,000
Less: Accumulated depreciation - equipment	(25,000)

Three months later, Archer completes the sale of the 8,000-watt generators for $28,000 less the broker's fee of $1,000. The loss is the difference between the $27,000 received for the sale and the net book value of $40,000, or $13,000. Archer records the sale as follows:

Dr	Cash	27,000	
Dr	Accumulated depreciation	25,000	
Dr	Loss on sale of equipment	13,000	
Cr	Equipment		65,000

The $13,000 loss will be reported on the income statement.

Example #2: The 8,000-watt generators are sold for $50,000 less the broker's fee of $1,750. The gain is the difference between the $48,250 received and the $40,000 net book value, or $8,250. The sale is recorded as follows:

Dr	Cash	48,250	
Dr	Accumulated depreciation	25,000	
Cr	Equipment		65,000
Cr	Gain on sale of equipment		8,250

The $8,250 gain will be reported on the income statement.

Other Income Statement Items

Unusual Gains and Losses

Unusual gains and losses are gains and losses the firm considers to be of an unusual nature or of a type that indicates infrequency of occurrence or both. Some examples of unusual losses are losses on inventory or other assets damaged in a fire and restructuring charges. So that users can better predict the amounts, timing, and uncertainty of, or prospects for, future cash flows, unusual losses may require separate presentation on the income statement.

Per ASC 220-20-45-1, unusual gains and losses are part of income from continuing operations. Unusual gains and losses are generally reported as **non-operating gains and losses** within income from continuing operations. Unusual gains or losses of a similar nature that are not individually material should be aggregated, that is, combined on one line. Unusual gains or losses that are material should be presented as separate line items or, alternatively, disclosed in the notes to financial statements.

Income from Continuing Operations

On the income statement, income from continuing operations is reported separately from income from discontinued operations.

Income from continuing operations is revenue minus expenses from all business operations that are ongoing, net of applicable income tax. Continuing operations are business operations that have not been and are not being discontinued and thus are expected to continue into the future.

Income from continuing operations is not limited to operating income. It includes non-operating items such as non-operating gains and losses, financial items such as interest revenue and interest expense, and income taxes on continuing operations, as long as those items are related to business activities that have not been and are not being discontinued.

A line titled "Income from continuing operations" appears on an income statement only if the company has income from discontinued operations to report. If there is income from discontinued operations to report (covered next), the income from discontinued operations appears on the income statement below income from continuing operations.

Discontinued Operations

Guidance in the *Accounting Standards Codification®* on presentation of discontinued operations in financial statements is in ASC 205-20.

A discontinued operation is defined as a component[67] or group of components of an entity that is either held for sale or has been disposed of by sale or otherwise that represents a **strategic shift** that has or will have a major effect on the entity's operations and financial results. A strategic shift that has or will have a

[67] A **component** is defined as operations and cash flows that can be clearly distinguished from the rest of the entity both operationally and for financial reporting purposes.

major effect on operations and financial results could include disposing of operations in a major geographical area or disposing of a major line of business, a major equity investment, or other major parts of the entity.

All gains or losses incurred by the discontinued component, including both gain or loss on operations of a component that is held for sale and gain or loss on the disposal of a component, are **reported net of tax in the period in which the gain or loss occurred**. The gain or loss from operations of the discontinued component and the gain or loss from the disposal, when the disposal takes place, are combined and reported on one line, followed by the income tax effect on the next line, either a tax benefit (for a loss) or a tax expense (for a gain), followed by the after-tax income or loss on discontinued operations. The gain/loss, the tax expense or tax benefit associated with the gain or loss of the discontinued component, and the net income or loss on discontinued operations should be reported below income from continuing operations, as follows.[68]

If a company has income from discontinued operations, its income statement looks like the following:

Sales revenues	$XXXXX	
Cost of goods sold	XXXX	
Gross profit	$XXXXX	
Selling, general, and administrative expenses	XXX	
Operating income	$XXXXX	
Interest and dividend income	XXX	
Interest expense	XXX	
Non-operating gains/(losses)	XXXX	
Income from continuing operations before income taxes	$XXXXX	
Provision for income taxes on continuing operations	XXXX	
Income from continuing operations		$ XXXX
Discontinued operations:		
Gain/(loss) from operations of discontinued Component X (including gain/[loss] on disposal of $XXX)	XXXX	
Income tax benefit or (income tax expense)	XXX	
Income (loss) on discontinued operations		XXXX
Net Income		$ XXXX

In addition to reporting the discontinued entity's results of operations in the current period, the company should also **reclassify to discontinued operations the net income or loss from the discontinued operations in any prior period income statements** being presented for comparison. Reclassification of prior period operating results is done so that the prior period financial statements are comparable to the current period financial statements.

In other words, all gains and losses from the component to be discontinued should be removed from income from continuing operations so users of the financial statements can see what income from continuing operations is without the operations of the component disposed of or to be disposed of.

Companies use the line "**Income from continuing operations**" on the income statement only when gains or losses on discontinued operations occur.

[68] ASC 205-20-45-3A.

Comprehensive Income and the Income Statement

Guidance in the *Accounting Standards Codification®* on presentation of the income statement is in ASC 225. Information from the FASB's Statements of Financial Accounting Concepts as amended December 2021 is also used in this topic.

Comprehensive income is defined by the FASB as "the change in equity (net assets) of a business entity during a period from transactions and other events and circumstances from nonowner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners."

The components of comprehensive income include all revenues, expenses, gains, and losses during a period.[69] The aggregation of most of the components of comprehensive income results in net income, which is reported on the **income statement**. However, certain revenues, expenses, gains, and losses are included in comprehensive income but are excluded from net income on the income statement. Those items are called **other comprehensive income**, and they are reported in an account in the equity section of the balance sheet called **accumulated other comprehensive income** (AOCI). Since it is a balance sheet account, it is a permanent account, and its balance is not closed out at the end of the period as the balances in income statement accounts are. Thus, **other comprehensive income** for a period is the **amount of change** in the accumulated other comprehensive income account during the period.

The statement of comprehensive income includes the income statement plus the other comprehensive income items. A company has the option to report net income and other comprehensive income either in a single continuous financial statement or in two separate but consecutive financial statements.

The specific list of the transactions that are reported as other comprehensive income items and are not included on the income statement are outside the scope of this exam. You need to know only that comprehensive income is a measure of income that includes ALL transactions of the company EXCEPT for transactions with owners. The common examples of transactions with owners that are **not** reported on the statement of comprehensive income are:

1) The sale and repurchase of shares of the company, and
2) Dividends paid by the company.

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[69] FASB Statement of Financial Accounting Concepts No. 8, *Conceptual Framework for Financial Reporting-Chapter 7, Presentation* (December 2021), paragraph PR18, p. 4.

Study Unit 23: B.1. Equity Transactions

Guidance in the *Accounting Standards Codification®* on accounting for owners' equity is in ASC 505.

Owners' equity, or shareholders' equity, is the "balancing" element of the balance sheet. Assets represent what the company owns, liabilities represent what the company owes to outside parties, and owners' equity represents what the company owes to the owners of the company. Regardless of the business's form or the total number of owners, those owners will most likely have a claim on some of the assets of the company, represented by the owners' equity on the balance sheet. More formally, owners' equity is defined as the residual interest in the assets of an entity after deducting its liabilities. In theory, if the owners were to liquidate the business, the owner's equity represents the amount due to them after all the assets are liquidated and external debts are paid. However, assets are recorded at their historical value but would be liquidated at the market value, and these two amounts are almost never the same.

The specific accounts a company has in the owners' equity section of its balance sheet will depend upon the form of the company. A sole proprietorship will have one capital account for the owner, whereas a partnership will have a capital account for each partner.

Note: On the exam, "owners' equity," "stockholders' equity," and "shareholders' equity" may be used interchangeably. Additionally, "equity" may be used without the word "owners'" or "stockholders'" or "shareholders'" preceding it.

Corporate Shareholders' Equity

The corporate balance sheet includes two main classifications of owners' equity: contributed capital and retained earnings.

1) **Contributed capital** consists of the assets put into the company by the owners in return for their share of ownership of the company. The fair value of what is received in exchange for the shares, whether cash or another asset, is recorded in two different equity accounts:

   - The **capital stock** account records the stated, or par, value of shares that have been sold. The company will have different capital stock accounts for each different type of share that it has issued.

   - The **additional-paid-in-capital** (**APIC**) account consists of the value received for the shares that was over and above the stated, or par, value. A company may have a number of different APIC accounts for either specific types of shares or specific transactions.

2) **Retained earnings** represent the **undistributed profits** of the company that were reinvested in the company. These may also be called undistributed earnings.

Corporations may sell two general types of stock: **common stock** or **preferred stock**.[70] The form and type of stock depends upon the way in which the company registered the stock and the characteristics the company has given to it.

Common Stock

Types of Common Stock

Common stock is classified according to whether or not it has a "par" value. Par value is the stated value of each share of stock, although the par value does not impact the selling price of the stock. The par value is assigned to the shares when they are registered and does not need to be any specific amount. In fact, par value is usually a small amount.

[70] It is possible for a company to have some type or class of stock that does not fall exactly into one of these two categories.

The par value of all shares issued represents the legal or stated capital of a company. **Legal capital** is the portion of contributed capital that is required by statute to be retained in a business, and it cannot be distributed as dividends. Because of the restriction against distribution of its legal capital, companies often choose to have a very low par value on their stock.

When shares are first issued and sold, the par value of the shares is credited to the common stock account and the rest of the cash received is credited to the additional paid-in capital-common stock (APIC-CS) account.

The two types of common shares based on the existence or non-existence of a par value are:

- **Par** (**or Stated**) **Value**. When stock has a par value, its par value is the maximum amount of a shareholder's personal liability to the creditors of the company. As long as the par value has been paid to the corporation by the shareholders for their purchase of the original issue of the stock, the shareholders obtain the benefits of limited liability, and their potential for loss is limited to the amount they paid for their shares.

  If stock is originally issued at **less** than its par value (at a discount), the owners of the stock may be called upon to pay in the amount of the discount to creditors if the corporation is subsequently liquidated and the creditors would have losses.

  Note: In most states a corporation is not permitted to issue shares at less than par value.

- **No-Par Value**. If stock has no par value, the legal capital is the total amount that is received when the shares are issued, and the whole amount received is credited to the common stock account.

Issuing Common Stock

When common shares are issued for cash, the journal entry for the issuance of common or preferred shares is:

Dr Cash .... **cash** received

Cr Common shares.............................. **par value** of shares issued

Cr Additional paid-in capital – common shares.... **balancing** amount

The entry above is the basic journal entry for all sales of stock, including preferred shares. For preferred shares, the names of the accounts are changed from "common shares" to "preferred shares" and from "additional paid-in capital-common shares" to "additional paid-in capital-preferred shares."

It does not matter if the sales price of the shares is above or below the fair value of the shares. Cash is debited for the amount of cash received and the amount received is allocated between common shares and APIC. **The only amount that will ever go into the common shares or preferred shares account is the par value of the shares sold.**

Dividends

Dividends are the distribution of current profits or of the retained earnings of the company to its owners. The declaration of cash dividends or property dividends reduces total stockholders' equity by means of either the distribution of an asset (cash or other property) or the incurrence of a liability (dividends payable if the dividend is not immediately distributed).

Dividends can be paid in various forms, but the most common form is cash. Whichever form the dividend takes, some asset of the company is distributed to the shareholders.

1) Cash Dividends

A cash dividend is the most common form of dividend, and the journal entries for cash dividends are simpler than those for other types of dividends. One of the important areas related to dividends is the dates governing payment because those dates determine when journal entries are made. The three dates related to the payment of a cash dividend are listed below:

1) The **date of declaration** is the day the board of directors formally declares the dividend. The board also announces the date of record and the date of payment. On the date the dividend is declared, the retained earnings account is debited, thus reducing the retained earnings balance, and a liability, "dividends payable," is credited. The amount of the journal entry is an estimated amount because the exact number of shares to which the dividend will be paid may change between the date of declaration and the date of record.

   The declaration of a dividend **reduces working capital**[71] because the entry increases the company's current liabilities.

   The journal entry at the date of declaration is:

   Dr Retained earnings X
   Cr Dividends payable X

2) The **date of record** is the date used to determine who actually will receive the dividend. Anyone who owns shares on the date of record receives the dividend when it is paid. Theoretically, no journal entry is made on the date of record because the entry on the date of declaration recognized the liability and the reduction in retained earnings. However, a company may need to make an entry on the date of record to adjust the estimate that was made on the date of declaration regarding the calculated total of dividends payable.

3) The **date of payment** is the date on which the dividend is paid. When the dividend is paid the liability is eliminated, and the cash account is decreased. The journal entry is:

   Dr Dividends payable X
   Cr Cash X

2) Stock Dividends

Guidance in the *Accounting Standards Codification*® on accounting for stock dividends is in ASC 505-20.

A stock dividend occurs when the company distributes a dividend in the form of additional shares. The journal entry to record the stock dividend will transfer some amount from retained earnings to the common stock and APIC accounts. The transfer from retained earnings is necessary because even though no cash is distributed to the shareholders, some of the earnings of the company are now "owed" to the shareholders in the form of the shares issued in the stock dividend. Also, the company now has more shares outstanding, and the increased number of shares outstanding needs to be recognized and recorded. Recognition and recording are accomplished by reducing retained earnings and increasing common stock and APIC. Because all the changes take place within the equity section of the balance sheet, the total value of the company's equity is not changed by a stock dividend, although the amounts in the various equity accounts are redistributed.

The journal entry required depends on the size of the dividend.

[71] Working capital is calculated as current assets minus current liabilities.

Small Stock Dividend

A small stock dividend is usually **less than 20-25%** of the total shares outstanding.[72]

Shares issued in a small stock dividend are valued at the **fair value of the shares on the date of declaration**:

Dr Retained earnings .... fair value of shares to be issued
Cr Common shares – issuable as a dividend .... par value of shares
Cr Additional paid-in capital – common shares...... balancing amount

The journal entry above is recorded on the date of declaration and **no adjustment to the amount is made for any change in the fair value** of the shares between the declaration date and the date of issuance.

Note: Even if the shares of stock will be distributed at a later date, **no dividend payable** is set up for a stock distribution. Rather, the credit is to an account called **common shares – issuable as a dividend** in the equity section of the balance sheet or some similar name. Thus, **no liability** is recorded on the balance sheet for a stock dividend.

On the date the stock is issued and the small stock dividend is distributed, the following entry is recorded:

Dr Common shares – issuable as a dividend ..... par value of shares
Cr Common stock... par value of shares

Large Stock Dividend

A large stock dividend is usually **more than 20-25%** of the total shares outstanding. If the stock dividend is a large stock dividend, the journal entry is based on the **par value of the shares**:

Dr Retained earnings .... par value of shares
Cr Common shares – issuable as a dividend .... par value of shares

When the stock is issued, the common shares issuable as a dividend account is debited and the common stock account is credited for the par value of the shares issued.

Retained Earnings

The retained earnings account is the final destination for all income statement (revenue, expense, gain, and loss) accounts. The retained earnings account represents the accumulated undistributed income of the corporation from its inception.

In the year-end close, net after-tax income for the year is moved to retained earnings, so retained earnings increases by the amount of the after-tax net income. The retained earnings account is decreased when dividends are declared. Retained earnings is a permanent balance sheet account, so the balance in it accumulates from year to year.

The balance in the retained earnings account represents all the profits of the company since it started minus any dividends declared and amounts transferred into paid-in-capital accounts.

[72] Per ASC 505-20-25-3, "The point at which the relative size of the additional shares issued becomes large enough to materially influence the unit market price of the stock will vary with individual entities and under differing market conditions and, therefore, no single percentage can be established as a standard for determining when capitalization of retained earnings in excess of legal requirements is called for and when it is not. Except for a few instances, the issuance of additional shares of less than 20 or 25 percent of the number of previously outstanding shares would call for treatment as a stock dividend . . ."

Classification of Shares

On the balance sheet and in more detail in the notes to financial statements, shares will be disclosed by giving the number of shares authorized, issued, and outstanding.

Authorized Shares

The number of **authorized shares** is the maximum number of shares the company can issue. The number of authorized shares is initially specified in the company's charter or articles of incorporation and can be changed only by filing an amendment to the articles of incorporation with the state where the company is incorporated. Such an amendment normally requires prior shareholder approval. Authorized shares can be issued or unissued, outstanding or not outstanding. Generally, a company has a much greater number of shares authorized than are issued or outstanding, which gives the company flexibility to issue more stock as needed.

The number of authorized shares is **not affected by stock dividends**, **stock splits**, **or treasury share transactions**. If a company wants to issue new stock, split its stock, declare a stock dividend, or issue stock to its senior management under stock option grants, and if the number of resulting new shares would exceed the number of authorized but unissued shares, the company must seek shareholder approval to increase the number of authorized shares and then file the necessary amendment to its articles of incorporation.

Note: Stock splits and treasury share transactions are not tested on the exam, but they are connected to the number of shares that a company has issued and outstanding.

Issued Shares

The number of **issued shares** is the number of shares that have been sold to investors at any point in the past and that have not been retired. Issued shares may currently be held either by others or by the company itself as treasury shares. The number of issued shares **is increased by both stock splits and stock dividends**. The number of issued shares is **not affected by treasury share transactions**. Treasury stock, that is, shares that have been issued and later repurchased by the issuer, continue to be issued shares, but they are not outstanding shares.

Outstanding Shares

The number of **outstanding shares** is the number of shares that are **currently owned by other parties**. Outstanding shares will be equal to the number of issued shares minus the number of shares held as treasury shares by the company itself. The number of shares outstanding is **increased by both stock splits and stock dividends**, **decreased by treasury share purchases**, **and increased if treasury shares are subsequently re-sold to investors**.

Study Unit 24: B.2. Basic Financial Statement Analysis

Comparative Financial Statement Analysis

One of the main difficulties in the comparison of financial statements between companies or between periods of time for the same company is the difference in size.

- When comparing two companies, one company may have a higher net income simply because it is bigger and not because it is more efficient, more effective, or sells a better product.
- When comparing financial statements for the same company over several accounting periods, the income statements may report significant sales growth during one of the periods, making comparison difficult.

One of the ways to deal with these size differences is through **comparative financial statement analysis**. Comparative financial statements state each item of the financial statement not as a numerical amount, but rather as a percentage of a relevant base amount.

Comparative financial statements can be either vertical or horizontal.

- **Vertical analysis**, also called **common-size financial statements**, makes it possible to compare the performance of companies of different sizes during the same period.
- Horizontal or **trend analysis**, also called **common-base year statements**, enables comparison of data for a single company or a single industry over time.

Vertical Common-Size Financial Statements

A simple vertical common-size financial statement covers one year's operating results and expresses each component as a percentage of a total.

- Line items on the income statement are usually presented as percentages of sales revenue. For example, selling expense is stated as a percentage of sales revenue.
- Line items on the balance sheet are usually presented as percentages of total assets. For example, cash is not stated as a monetary amount but rather as a percentage of total assets.

However, common-size financial statements do not need to relate each balance sheet item to total assets only. For example, the analysis might focus on the company's inventory and calculate percentages of raw materials, work in process, and finished goods in total inventories. Or the analysis might focus on the composition of the company's investments, both current and noncurrent.

A vertical common-size income statement might state each classification of sales revenue or expenses as a percentage of total revenues. Alternatively, it might state general and administrative expenses and selling expenses each as a percentage of total operating expenses. A common-size financial statement can be anything an analyst wants to see or analyze.

An analyst might also compare a company's common-size income statement with industry common-size income statements to potentially reveal a problem. For instance, if cost of goods sold as a percentage of total sales revenue is significantly higher than the norm for other firms in the same line of business, it could indicate that "inventory shrinkage" (in other words, theft) is taking place.

In addition, common-size financial statements for one company can be arranged side by side for a period of several years to reveal trends over time in individual line items as percentages of total assets or sales revenue.

An example of a vertical common-size financial statement follows.

Example: **A vertical common-size financial statement.** Following is a balance sheet and income statement for a company with the actual numbers in the first column and the common size vertical numbers in the second column (in thousands, 000 omitted). Each individual balance sheet item has been divided by the total assets and each individual income statement item has been divided by the total net revenues. This common-size vertical statement can be compared with common-size statements for other companies, regardless of their sizes or can be prepared for several years for the same company to enable side-by-side comparison.

	20X3 Actual	20X3 Common Size
Balance Sheet:		
ASSETS		
Current Assets:		
Cash & cash equivalents	$ 2,895	10.9%
Marketable securities - current	14,100	53.2%
Accounts receivable, net	700	2.7%
Inventories	400	1.5%
Other current assets	300	1.1%
Total current assets	$ 18,395	69.4%
Noncurrent Assets:		
Intangible assets	$ 4,500	17.0%
Property, plant & equipment, net	2,400	9.1%
Other noncurrent assets	1,200	4.5%
Total assets	$ 26,495	100.0%
LIABILITIES		
Current Liabilities:		
Accounts payable	$ 600	2.3%
Accrued liabilities	500	1.9%
Other current liabilities	1,700	6.4%
Total current liabilities	$ 2,800	10.6%
Noncurrent Liabilities:		
Long-term debt	$ 5,000	18.8%
Other noncurrent liabilities	4,300	16.2%
Total liabilities	$ 12,100	45.7%
STOCKHOLDERS' EQUITY		
Preferred stock	$ 100	0.4%
Common stock	1,685	6.4%
Paid-in capital	5,780	21.8%
Retained earnings	6,830	25.8%
Total stockholders' equity	$ 14,395	54.3%
Total liabilities and stockholders' equity	$ 26,495	100.0%
Income Statement:		
Revenues:		
Net revenues	$ 10,400	100.0%
Cost of goods sold	3,200	30.8%
Gross profit	$ 7,200	69.2%
Operating expenses:		
Research and development	$ 3,000	28.9%
Selling, general and administrative	1,500	14.4%
Total operating expenses	$ 4,500	43.3%
Operating income	$ 2,700	25.9%
Non-operating income and expenses:		
Gains (losses) on equity securities	(344)	(3.3%)
Financial income:		
Interest and dividend income	177	1.7%
Earnings before interest and taxes (EBIT)	$ 2,533	24.3%
Interest expense	(400)	(3.8%)
Earnings before tax (EBT)	$ 2,133	20.5%
Income tax expense	(533)	(5.1%)
Net income	$ 1,600	15.4%

Horizontal Trend Analysis

Horizontal trend analysis, also called horizontal common-size analysis, is used to evaluate trends for a single business over a period of several years. In analyzing the income statement, changes in revenues or expenses over time can indicate, for example, the effectiveness of a company's change in pricing strategy or its efforts to improve operations.

Horizontal trend analysis can be in the form of **common base year** financial statements or as a **variation analysis**, a presentation of the **annual growth rates of line items**.

Common base year financial statements use the first year presented as the base year. Financial statement amounts for subsequent years are presented not as monetary amounts but as percentages of their base year amounts, with the base year assigned a value of 100% or 100. For example, each year's inventories are stated as percentages of the base year inventories and each year's fixed assets are stated as percentages of the base year fixed assets.

$$\text{Common Base Year Statement Line Item Amount (\%)} = \frac{\text{New Line Item Amount}}{\text{Base Year Line Item Amount}} \times 100$$

Example of a common base year line item, where 20X1 is the base year:

	20X3	**20X2**	**20X1**
Net revenues	$10,400	$11,100	$9,900
Common base year line item:			
Net revenues	105.1%	112.1%	100.0%

Horizontal analysis can also be done as a **variation analysis** in the form of a presentation of the **annual** growth rates of individual line items. For each line item on either the income statement or the balance sheet, the percentage of change year-over-year is calculated by dividing the new line item amount by the old line item amount, subtracting 1 from the quotient, and multiplying the resulting decimal by 100 to convert it to a percentage.

Instead of being a percentage of the base year amount as in common base year financial statements, each year's percentage is the percentage of change from the previous year's value.

$$\text{Annual Growth Rate of Line Item (\%)} = \left(\frac{\text{New Line Item Amount}}{\text{Old Line Item Amount}}\right) - 1 \times 100$$

If a line item has decreased from the previous year, the growth rate will be negative.

Example of a variation analysis, where the line item increases and then decreases:

	20X3	**20X2**	**20X1**
Net revenues	$10,400	$11,100	$9,900
Variation analysis - growth rate:			
Net revenues	−6.3%	+12.1%	

Introduction to Financial Statement Ratios

Ratios are classified into various categories based on what they are measuring. The classifications used on the FMAA exam are:[73]

- **Liquidity ratios**, which measure the sufficiency of the firm's cash resources to meet its short-term cash obligations.
- **Leverage, capital structure, solvency, and earnings coverage ratios**, which evaluate the firm's ability to satisfy its fixed financing charges, including debt obligations and obligations to make lease payments, by looking at the mix of its financing sources and its historical earnings.
- **Activity ratios**, which provide information on a firm's ability to manage efficiently its current assets (accounts receivable and inventory) and current liabilities (accounts payable).
- **Profitability analysis**, which measures the firm's profit in relation to its total revenue or the amount of net income earned from each currency unit of sales revenue and its return on invested assets.

Ratios are **based on accounting data.** Because many items in the accounting system use historical costs rather than current fair values, ratios often do not reflect the current values of the items they are measuring.

Note: Two rules should always be followed when calculating ratios that include both balance sheet and income statement items:

1) **Average balances of balance sheet items** are used instead of ending balances whenever a ratio calculation is relating an **income statement** amount to a **balance sheet** amount. The average balance amount should be the average balance of the balance sheet item **during the same period as is covered by the income statement item**. Using the average balance of the balance sheet item over the same period as is covered by the income statement item makes the relationship of the two amounts meaningful. The average balance is usually calculated as the average of the beginning and ending balances of the period.

   If a year-end balance sheet amount were used in the ratio, that amount would represent the balance sheet item's balance only as of one moment in time, and thus it would not be comparable to an income statement figure covering a range of "moments in time."

   Note: If both the numerator and the denominator of a ratio are balance sheet amounts, year-end balances can be used instead of average balances for both the numerator and the denominator of the ratio.

(continued)

[73] The ratios in the HOCK study materials for the FMAA exam are presented as they appear on the ICMA's *Ratio Definitions* formula sheet and are the way the ratios will be tested on the FMAA exam.

2) When the period represented by an income statement amount in a ratio is less than one year, the goal is to **annualize** the income statement item by expressing it as if that same level of revenue or expense had persisted for a full year. To annualize an income statement amount that is for less than a full one-year period, annualize it as follows.

- If the income statement amount is for one quarter, multiply it by 4 to annualize it.
- If the income statement amount is for one month, multiply it by 12 to annualize it.
- If the income statement amount is for five months, divide it by 5 months to find one month's revenue or expense and then multiply the result by 12 months to annualize it.
- If the income statement amount is for a period not evenly divisible by 4 or 12 or a number of months (for example, for 35 days or 54 days or any such amount), divide the income statement amount by the number of days to find one day's revenue or expense and then multiply the result by 365 days to annualize it.

However, the average balance used for the balance sheet amount in the ratio should be for **only the period covered by the partial-period income statement**, not for a full year.

Study Unit 25: B.3. Liquidity Ratios

Liquidity Ratios

Several ratios are used to evaluate a company's liquidity and the level of its net working capital. The liquidity ratios are:

1) Current Ratio
2) Quick Ratio or Acid Test Ratio
3) Cash Ratio
4) Cash Flow Ratio
5) Net Working Capital Ratio

Current Ratio

The current ratio is the most common measure of short-term liquidity, as it relates current assets to the claims of short-term creditors. Whereas net working capital expresses this relationship as an amount of currency, the current ratio expresses the relationship as a ratio.

$$\textbf{Current Ratio} = \frac{\textbf{Current Assets}}{\textbf{Current Liabilities}}$$

Generally, a firm's current ratio should be proportional to its operating cycle. The shorter the operating cycle is, the lower the current ratio can be because the operating cycle will generate cash more quickly for a firm with a shorter operating cycle than it will for a firm with a longer operating cycle. The cash generated can be used to settle the liabilities.

The effective management of working capital requires that working capital be kept as low as possible while at the same time being balanced against the risk of illiquidity (the inability to satisfy current liabilities with current assets). Companies with an aggressive financing policy that are willing to assume more risk of illiquidity will have lower current ratios, while companies with conservative financing policies will have higher current ratios. The less risk the company's management wants to assume, the higher its current ratio and level of working capital will be.

The standard for the current ratio is 2:1. A lower ratio indicates a possible liquidity problem.

Quick or Acid Test Ratio

The quick ratio, also called the acid test ratio, is a more conservative version of the current ratio. The quick ratio measures the firm's ability to pay its short-term debts using its most liquid assets.

$$\textbf{Quick Ratio (Acid Test Ratio)} = \frac{\textbf{Cash \& Cash Equivalents + Marketable Securities Classified as Current Assets + Net Accounts Receivable}}{\textbf{Current Liabilities}}$$

Cash equivalents are very liquid, short-term investment instruments with a maturity date of less than 90 days when they were acquired that are easily converted into known amounts of cash without significant loss in value. Cash equivalents are the short-term investments a company makes to earn a return on excess cash for short periods until the cash is needed for operations.

Marketable securities included in the numerator of the quick ratio are investments in equity and debt securities that have an active secondary market **and** are classified as current assets.

Inventory is **not** included in the numerator of the quick ratio, because the company will need to replace sold inventory, and that requires cash. If a company uses liquidation of its inventory to pay its liabilities without replacing the inventory, the company will have no means of generating future cash flows. For that reason, inventory should not be liquidated to pay off short-term liabilities. Furthermore, inventory is not as liquid an asset as, for instance, accounts receivable.

Note that prepaid expense is also **not** included in the numerator of the quick ratio. Prepaid expenses are not current assets in the sense that they can be converted into cash, but only in the sense that, if not paid in advance, they would require the use of current assets during the operating cycle. Therefore, they are not included.

Accounts receivable **are** included in the numerator of the quick ratio, for two reasons:

1) Receivables are only one step away from conversion to cash in contrast to inventory, which is two steps away.

2) A company can almost always collect its receivables immediately by factoring them. *(Factoring is covered in detail in Accounts Receivable Management in Section A in this volume.)*

The standard for the quick ratio is 1:1.

Cash Ratio

The cash ratio is another version of the current ratio that is even more conservative than the quick ratio. The cash ratio is the ratio between cash and current liabilities. Only cash and securities that are easily convertible into cash are used in the numerator, so cash equivalents and marketable securities classified as current assets are included in the numerator along with cash for purposes of calculating the cash ratio.

$$\textbf{Cash Ratio} = \frac{\textbf{Cash \& Cash Equivalents} \; \textbf{+ Marketable Securities Classified as Current Assets}}{\textbf{Current Liabilities}}$$

As with the quick ratio, only marketable securities classified as current assets are included in the numerator of the cash ratio.

Cash Flow Ratio

The cash flow ratio is the net cash flow generated by operations compared with current liabilities. It measures how many times greater the cash flow generated by operations is than current liabilities. If a company has positive working capital but it is not generating enough cash from operations to settle its obligations as they become due, the company is probably borrowing to settle current liabilities. Over the long term, borrowing to fulfill current liabilities will lead to solvency problems, because the company is simply exchanging one current liability for another current liability and there is a limit to how much financing a company can obtain. Therefore, it is much better if the company can generate adequate cash flow from its operations to settle its current liabilities.

$$\textbf{Cash Flow Ratio} = \frac{\textbf{Operating Cash Flow}}{\textbf{Period-End Current Liabilities}}$$

Operating cash flow in the numerator is net cash provided by operating activities as reported on the statement of cash flows.

In the cash flow ratio, the **period-end balance** for current liabilities is used instead of the average balance for current liabilities. An average balance incorporates past balances. The cash flow ratio is an indicator of the company's ability to pay **future** obligations as they come due. Future cash flow will be required to pay off current liabilities that are outstanding **as of the balance sheet date**, not the average of current liabilities over a past period. Therefore, use of the period-end balance for current liabilities is preferred in the cash flow ratio because it is more conservative.

The net cash provided by operating activities in the numerator should be annualized. "Annualized" means that if the cash provided by operating activities figure being used is for a period of less than a year (such as a quarter or a month), it should be annualized by multiplying it by whatever is necessary to express it in terms of the equivalent annual operating cash flow before dividing it by current liabilities as of the balance sheet date. For example, if the statement of cash flows for which net cash provided by operating activities is reported is for a period of one quarter, the operating cash flow figure should be multiplied by 4 to annualize it. If it is for a one-month period, it should be multiplied by 12.

An annualized cash flow ratio of 0.40 or higher is a standard for a healthy company.

Net Working Capital Ratio

Net working capital (also called working capital) is current assets minus current liabilities. The **net working capital ratio** is the proportion of total assets (total capitalization) represented by net working capital. The net working capital ratio measures the firm's ability to meet its obligations and expand by maintaining sufficient working capital.

$$\textbf{Net Working Capital Ratio} = \frac{\textbf{Net Working Capital (Current Assets – Current Liabilities)}}{\textbf{Total Assets}}$$

The net working capital ratio is particularly meaningful when compared with the same ratio in previous years, especially if it is decreasing. Consistent operating losses will cause net working capital to shrink relative to total assets, an indication of possible future business failure.

If working capital is negative (current liabilities are greater than current assets), the net working capital ratio will also be calculated as a negative number. A negative net working capital ratio is not meaningful since the proportion of total assets represented by net working capital cannot be less than zero percent. However, negative working capital is an indicator of very serious problems.

Study Unit 26: B.3. Leverage Ratios

Leverage Ratios

Solvency is the ability of the company to pay its long-term obligations as they come due. In contrast to liquidity, which is the ability to pay short-term obligations by liquidating current assets, solvency is the ability to pay long-term obligations from earnings. A firm is solvent if its assets are greater than the sum of its debt obligations.

The composition of a company's capital structure is an important part of solvency analysis. An increase (decrease) in the level of debt will increase (decrease) the company's interest expense and its financial leverage, all other things being equal. If the increase (decrease) in the level of debt also increases (decreases) the company's debt relative to the level of its equity, the increase (decrease) in financial leverage will decrease (increase) the company's solvency.

In addition to capital structure, solvency depends on successful, profitable operations, because profits are the source of the cash to make interest and principal payments. Therefore, solvency analysis also involves analysis of earnings and the ability of those earnings to cover necessary company expenditures, including the required debt service.

Financial leverage is the use of debt to increase earnings. Financial leverage refers to the potential to earn a high level of return relative to the amount expended in interest expense on debt. Interest is the cost of using debt to finance operations. Interest is a fixed charge because unlike dividends, interest must be paid whether the firm is profitable or not. The use of financing that carries a fixed charge is called financial leverage.

Just as financial leverage measures the use of fixed interest expense charged on debt financing to generate greater returns for equity investors, **operating leverage** measures the use of fixed operating costs to generate greater operating profit. Operating leverage refers to the fact that, for a given level of fixed expenses, a given percentage change in sales will result in a higher percentage of change in earnings before interest and taxes (EBIT).

Capital Structure and Solvency Ratios

Capital structure and solvency ratios are also used to evaluate a company's leverage. Capital structure and solvency ratios include the following ratios:

- Debt to equity ratio.
- Long-term debt to equity ratio.
- Debt to total assets ratio.

Debt to Equity Ratio

The debt to equity ratio is a comparison of how much of the financing of assets comes from creditors with the amount of financing that comes from owners in the form of equity.

$$\textbf{Debt to Equity Ratio} = \frac{\textbf{Total Liabilities}}{\textbf{Total Equity}}$$

In the debt to equity ratio, "total liabilities" includes all liabilities, and "total equity" consists of all stockholders' equity including preferred equity.

A debt to equity ratio of 2.00, or 2:1, for example, means that the company's total debt is twice its total equity, or its debt financing consists of $2.00 of debt for every $1.00 of equity.

The debt to equity ratio can serve as a screening device for the analyst when looking at capital structure ratios. If this ratio is extremely low (for instance, 0.1:1), then there is no need to calculate other capital structure ratios because there is no real concern with this part of the company's financial situation. The analyst's time could be better spent looking at other aspects of the company's operations. However, if the debt to equity ratio is around 2:1 or higher, it would be important to do some extended analysis that focuses on other ratios such as profitability, as well as the company's future prospects.

Long-Term Debt to Equity Ratio

The long-term debt to equity ratio measures how much long-term debt a company has compared to its total equity.

$$\text{Long-term Debt to Equity Ratio} = \frac{\text{Total Debt} - \text{Current Liabilities}}{\text{Total Equity}}$$

Because the numerator of the above ratio is Total Debt − Current Liabilities, the numerator includes the non-current portion of long-term debt only. The current portion of long-term debt and other current liabilities are excluded.

A ratio greater than 1:1 indicates more reliance on long-term debt financing than on equity financing.

Debt to Total Assets Ratio

The debt to total assets ratio measures the proportion of the company's total assets that are financed by creditors, an indication of the firm's long-term debt repayment ability.

$$\text{Debt to Total Assets Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

Lenders and other creditors would like the debt to total assets ratio to be as low as possible because a lower ratio indicates a lower risk of the company's defaulting on its debt, whereas a higher ratio indicates a higher risk of default. Therefore, the higher the debt to total assets ratio is, the higher the company's cost of debt (interest rate) will be, because lenders and creditors will demand compensation for the increased risk they are bearing.

The numerator of the debt to total assets ratio includes all liabilities, including current liabilities such as accounts payable, even though accounts payable probably do not require interest payments; and because payables are always turning over (being paid and being replaced by other payables), they generally do not decrease as would a loan on which principal payments are being made. Including all liabilities makes the Debt to Total Assets ratio more conservative than ratios that include only long-term debt in the numerator.

Earnings Coverage Ratios

Earnings coverage ratios are related to financial leverage because one of the key issues related to debt is the fact that a fixed payment (interest) must be made on a regular basis. The more debt a firm has, the bigger its interest obligation becomes. As the company's interest obligation becomes larger, the risk becomes greater that the company will not be able to cover its interest payments and will default on the debt.

While capital structure ratios such as those above can provide information on how much of a company's financing comes from debt, they cannot provide information on whether the company will have enough earnings to service the debt. Therefore, **earnings coverage** ratios are used to focus on the company's **earning power**, because the company's ability to generate earnings will be the source of its interest

payments, as well as the source for its principal repayments. Earnings coverage ratios measure the relationship between the fixed interest charges the company is obligated to pay and the earnings available to meet those charges.

Note: **Earning power** refers to **earnings coverage**. Earnings coverage is important because it is the source of interest payments and principal repayments. Long-term earnings are necessary because they create liquidity, solvency, and borrowing capacity for a company.

The one earnings coverage ratio that you need to know is the interest coverage ratio.

Interest Coverage (Times Interest Earned) Ratio

The interest coverage ratio, also called the **times interest earned** ratio, compares the funds available to pay interest (earnings **before interest** and taxes) with the amount of interest expense on the income statement. Interest expense on the income statement includes interest expense on debt obligations and on finance leases.

$$\text{Interest Coverage Ratio (Times Interest Earned)} = \frac{\text{Earnings Before Interest and Taxes (EBIT)}}{\text{Interest Expense}}$$

The Interest Coverage Ratio gives an indication of how much in earnings the company has available for the payment of its fixed interest expense. Earnings before interest and taxes is used in the numerator because interest is a tax-deductible expense. Therefore, pre-tax earnings can be used to pay interest.

A high interest coverage ratio is desirable. An interest coverage ratio of greater than 3.0 is excellent. When the interest coverage ratio gets down to 1.5, the company has a heightened risk of default. The further the ratio declines below 1.5, the higher the risk of default becomes.

However, the interest coverage ratio is a simplified measure because it does not include obligations for operating and short-term lease payments in the denominator, nor does it add back expensed operating and short-term lease payments to the numerator. The interest coverage ratio also does not include in the denominator required principal repayments on debt or required lease liability payments on finance leases, which are equivalent to principal payments on a loan.

Study Unit 27: B.3. Activity Ratios

Activity Ratios

Activity ratios provide information about a firm's ability to efficiently manage its current assets—specifically its accounts receivable and inventory—and its ability to effectively manage its accounts payable.

Accounts Receivable Activity Ratios

The accounts receivable activity ratios indicate the speed with which the company collects its receivables. The accounts receivable activity ratios should be evaluated by comparing them with industry averages and with previous periods' ratios for the same company.

Accounts Receivable Turnover Ratio

The accounts receivable turnover ratio measures the number of times receivables "turn over" during a period of a year, that is, the number of times they are collected and are replaced with new receivables. It tracks the efficiency of a firm's accounts receivable collections efforts and indicates the amount of investment in receivables that is needed to maintain the firm's level of sales.

Comparing a company's accounts receivable turnover ratio from one year to the next enables analysis of how the company's collection rate has changed over time. An **increase** in the accounts receivable turnover ratio indicates that receivables are being collected more rapidly, a good thing. A **decrease** indicates slower collections, which is less desirable. A company's accounts receivable turnover ratio can also be compared with industry averages to determine whether the company's collections are in line with those of its competitors.

$$\textbf{Accounts Receivable Turnover Ratio} = \frac{\textbf{Net Annual Credit Sales}}{\textbf{Average Gross Accounts Receivable}}$$

"Net annual credit sales" means gross credit sales net of the allowance for returns and allowances. Note that the numerator of this ratio represents a full year's net credit sales.

Days' Sales in Receivables (Average Collection Period)

The days' sales in receivables, or average collection period, is another measure of how efficiently the company is collecting its accounts receivable. The average collection period is the average number of days receivables remain outstanding before being collected.

The average collection period can be calculated in several different ways. Which one is used is simply a matter of personal preference.

A. $$\textbf{Days' Sales in Receivables (Average Collection Period)} = \frac{\textbf{365}}{\begin{array}{c}\textbf{Accounts Receivable Turnover Ratio} \\ \text{(Net Annual Credit Sales} \div \\ \text{Average Gross Accounts Receivable)}\end{array}}$$

Or a variation on A, because to divide by a fraction, invert the fraction and multiply:

B. Days' Sales in Receivables (Average Collection Period) $= 365 \times \dfrac{\textbf{Average Gross Accounts Receivable}}{\textbf{Net Annual Credit Sales}}$

Or,

C. Days' Sales in Receivables (Average Collection Period) $= \dfrac{\textbf{Average Gross Accounts Receivable}}{\textbf{Average Daily Net Credit Sales}}$
(Net Annual Credit Sales ÷ 365)

The accounts receivable turnover ratio and days' sales in receivables, or average collection period, should be compared with industry averages, with previous periods' amounts for the same company, and with the company's credit terms. The number of days of sales in receivables should not be higher than the standard credit terms offered by the company. An average collection period that is higher than the standard credit terms offered may indicate poor collection efforts, customer dissatisfaction leading to refusal to pay, customers in financial distress, or an extreme delay of payment by one or more large customers.

If the average collection period increases over time while the accounts receivable turnover ratio decreases over time, the analyst should consider the possibility that special conditions exist that have caused the deterioration. For example, the company might be extending liberal credit terms to increase sales, perhaps as a marketing tool to launch a new product or to better utilize excess production capacity.

Inventory Activity Ratios

Inventory activity ratios provide a measure of both the **quality** and the **liquidity** of the inventory on hand. Both quality and liquidity of inventory give an indication of the **salability** of the inventory. As with the accounts receivable activity ratios, the inventory activity ratios should be evaluated by comparing them with industry averages and with previous periods' amounts for the same company.

Inventory Turnover Ratio

The inventory turnover ratio indicates how many times during the year the company sells its average level of inventory and replaces it with new inventory.

Inventory Turnover Ratio $= \dfrac{\textbf{Annual Cost of Goods Sold (COGS)}}{\textbf{Average Inventory}}$

The annual average inventory may be calculated as simply the average of the year's beginning inventory and ending inventory. However, if inventory fluctuates seasonally, a more useful average inventory figure would result from averaging actual quarterly beginning and ending or even monthly beginning and ending inventory balances. The quarterly or monthly averages can then be averaged to develop the average for the year.

Days' Sales in Inventory

The number of days' sales in inventory is another measurement of the efficiency of inventory management. The days' sales in inventory represents the **average** number of days that inventory items remain in stock before being sold, or the **average** number of days required to sell an item of inventory. The number of

days' sales in inventory should be low but not too low, because if it is too low, the company is risking lost sales because of not having enough inventory on hand.

Like days' sales in receivables, the days' sales in inventory can be calculated in several different ways:

A. Days' Sales in Inventory $= \dfrac{\textbf{365}}{\textbf{Inventory Turnover Ratio} \text{ (Annual COGS / Average Inventory)}}$

Or a variation on A, because to divide by a fraction, invert the fraction and multiply:

B. Days' Sales in Inventory $= 365 \times \dfrac{\textbf{Average Inventory}}{\textbf{Annual COGS}}$

Or,

C. Days' Sales in Inventory $= \dfrac{\textbf{Average Inventory}}{\textbf{Average Daily COGS} \text{ (Annual COGS} \div \text{365)}}$

All the ways of calculating days' sales in inventory will yield the same answer. The method of calculating it is a matter of personal preference.

Accounts Payable Activity Ratios

Accounts payable activity ratios indicate the speed with which the company pays its suppliers.

Accounts Payable Turnover Ratio

The accounts payable turnover ratio represents the number of times payables "turn over," that is, the number of times they are paid and new ones are generated by new purchases, during a period of a year. It indicates the speed with which the company pays its suppliers.

Accounts Payable Turnover Ratio $= \dfrac{\textbf{Annual Credit Purchases}}{\textbf{Average Accounts Payable}}$

Note that the numerator of this ratio represents a full year's credit purchases. As with accounts receivable and inventory, if the credit purchases figure in the numerator is for a period of less than one year, the credit purchases should be annualized (one quarter's credit purchases should be multiplied by 4, and so forth). The average used for average accounts payable should represent the average during the period represented by the credit purchases being analyzed, even if it is less than a one-year period.

A decrease in the accounts payable turnover ratio over time means the company is paying its payables more slowly, an indication of possible liquidity problems.

Days' Purchases in Accounts Payable

The days' purchases in accounts payable represents the average number of days the company takes to pay its payables. The days' purchases in accounts payable is calculated as follows:

$$\text{A. Days' Purchases in Payables} = \frac{365}{\text{Accounts Payable Turnover Ratio}}$$

(Annual Credit Purchases ÷ Average Accounts Payable)

$$\text{B. Days' Purchases in Payables} = 365 \times \frac{\text{Average Accounts Payable}}{\text{Annual Credit Purchases}}$$

Or,

$$\text{C. Days' Purchases in Payables} = \frac{\text{Average Accounts Payable}}{\text{Average Daily Credit Purchases}}$$

(Annual Credit Purchases ÷ 365)

Total Asset Turnover Ratio

Total asset turnover is an overall activity ratio relating total sales to average total assets:

$$\text{Total Asset Turnover Ratio} = \frac{\text{Sales}}{\text{Average Total Assets}}$$

The total asset turnover ratio measures the amount of sales revenue the company is generating from the use of each currency unit it has invested in average total assets. The total asset turnover ratio provides a means of measuring the overall efficiency of the company's use of all its investments, including both current assets and non-current assets.

Fixed Asset Turnover Ratio

The fixed asset turnover ratio measures the amount of sales revenue the company is generating from each currency unit invested in only its **net fixed** assets.

$$\text{Fixed Asset Turnover Ratio} = \frac{\text{Sales}}{\text{Average Net Property, Plant, and Equipment}}$$

"Net property, plant, and equipment" means property, plant, and equipment net of accumulated depreciation.

Since both the total asset turnover ratio and the fixed asset turnover ratio relate an income statement item to a balance sheet item, the denominator (the assets amount) for both should be an **average balance** for the same period represented by the sales revenue amount. The average of the beginning and ending net PP&E balances can be used as the average balance.

Study Unit 28: B.3. Profitability Ratios

Profitability Ratios

Gross Profit Margin Percentage

Gross profit is net sales revenue less cost of goods sold. The gross profit margin percentage is a percentage, or ratio, of gross profit to sales revenue.

$$\textbf{Gross Profit Margin Percentage} = \frac{\begin{array}{c}\textbf{Gross Profit} \\ \text{(Net Sales Revenue − Cost of Goods Sold)}\end{array}}{\textbf{Net Sales Revenue}}$$

"Net Sales Revenue" is sales revenue minus sales discounts and sales returns and allowances. If information on sales discounts and sales returns and allowances is not given in a problem and only "Sales" is given, then assume that "Sales" is "Net Sales Revenue."

Example: The gross profit margin percentage below is 33%, calculated as $4,000,000 ÷ $12,000,000:

		Percentage of Net Sales Revenue
Net sales revenue	$ 12,000,000	
Cost of goods sold	8,000,000	
Gross profit	$ 4,000,000	**0.333 or 33.3% = Gross Profit Margin**

The gross profit margin percentage is the percentage of the sales revenue available to cover expenses other than cost of sales, usually called selling, general, and administrative expenses, or SG&A. Gross profit margin percentage is an important measurement of a company's performance, because for a company to operate profitably, all the SG&A expenses must be covered by the gross profit, and operating income is the amount remaining after those costs have been covered. Therefore, the company's gross profit margin percentage is the key to its overall profitability.

Operating Profit Margin Percentage

The operating profit margin percentage measures how much of its net sales revenue the firm keeps as operating income.

The operating profit margin percentage is calculated as:

$$\textbf{Operating Profit Margin Percentage} = \frac{\textbf{Operating Income}}{\textbf{Net Sales Revenue}}$$

The difference between the gross profit margin percentage and the operating profit margin percentage is the percentage of net sales revenue represented by SG&A operating expenses.

Operating income includes revenues and expenses of the company's principal operations. It does not include revenues and expenses that result from secondary or auxiliary activities of the company, gains and losses from investments, or gains and losses from discontinued operations. The difference between the gross profit margin and the operating profit margin is the percentage of net sales revenue represented by selling, general, and administrative operating expenses that relate to the company's principal operations.

Example: The operating profit margin below is 12.5%, calculated as $1,500,000 ÷ $12,000,000:

		Percentage of Net Sales Revenue
Net sales revenue	$ 12,000,000	
Cost of goods sold	8,000,000	**0.667 or 66.7%**
Gross profit	$ 4,000,000	**0.333 or 33.3% = Gross Profit Margin**
Operating expenses*	2,500,000	**0.208 or 20.8%**
Operating income	$ 1,500,000	**0.125 or 12.5% = Operating Profit Margin**

* Operating expenses include period costs such as selling, general, and administrative expenses that relate to the company's principal operations and are expensed as incurred.

Net Profit Margin Percentage

Net income includes revenues and expenses of the company from all sources (except for other comprehensive income items, which are reported directly in equity in accumulated other comprehensive income). It includes revenues and expenses from the company's principal operations and secondary or auxiliary activities of the company, gains and losses from investments, and gains and losses from discontinued operations, net of taxes. The net profit margin percentage measures the percentage of sales revenue that becomes profit.

The net profit margin percentage is calculated as:

$$\textbf{Net Profit Margin Percentage} = \frac{\textbf{Net Income}}{\textbf{Sales Revenues}}$$

The difference between the operating profit margin percentage and the net profit margin percentage is the percentage of sales revenue represented by financial income and expense (interest and dividend income and interest expense), non-operating gains and losses including investment gains and losses and gain or loss on discontinued operations, and the provision for income taxes.

Example: The net profit margin percentage below is 10.2%, calculated as net income of $1,218,857 divided by $12,000,000 in net sales.

		Percentage of Net Sales Revenue
Net sales revenue	$ 12,000,000	
Cost of goods sold	8,000,000	**0.667 or 66.7%**
Gross profit	$ 4,000,000	**0.333 or 33.3% = Gross Profit Margin**
Operating expenses	2,500,000	**0.208 or 20.8%**
Operating income	$ 1,500,000	**0.125 or 12.5% = Operating Profit Margin**
Interest and dividend income	$ 25,000	
Interest expense	40,000	
Non-operating gains	57,857	
Income before tax	$ 1,542,857	**0.129 or 12.9%**
Provision for income tax at 21%	324,000	**0.027 or 2.7% of net sales revenue**
Net income	$ 1,218,857	**0.10.2 or 10.2% = Net Profit Margin %**

Changes in the net profit margin percentage can be caused by changes in gross profit, changes in other operating expenses and/or changes in other non-operating incomes and expenses. Analyzing the causes of changes in the net profit margin usually will involve a line-by-line analysis of the income statement. Vertical

analysis (common size financial statements) and horizontal analysis (common base year statements) or a horizontal analysis in the form of a **variation analysis**, can be helpful in detecting sources of variations in the net profit margin from year to year. Variations in individual line items can then be investigated to determine the causes.

Return on Assets (ROA)

Probably the most widely recognized measure of company performance is return on assets. Return on assets measures how much return the company earns on the capital it has invested in its assets and thus it measures the company's success in using financing to generate profits. The higher the ROA, the better, or more effectively, the company is using its assets. ROA is also a good measure of the company's solvency and its risk of insolvency.

The formula for return on assets is:

$$\textbf{Return on Assets (ROA)} = \frac{\textbf{Income}}{\textbf{Average Total Assets}}$$

"Average total assets" is usually calculated as the average of the beginning and ending balances of total assets for the same one-year period as represented by income in the numerator, as follows:

$$\textbf{Average Assets} = \frac{\textbf{Beginning Assets + Ending Assets}}{\textbf{2}}$$

Return on Equity (ROE)

Return on equity measures the return the business receives on the stockholders' equity invested in the business.

The return on equity formula is as follows:

$$\textbf{Return on Equity (ROE)} = \frac{\textbf{Income}}{\textbf{Average Equity}}$$

Average equity in the denominator of return on equity includes preferred stock. However, if a company has preferred stock outstanding, **return on *common* equity** is more meaningful because it focuses on the return to **common** shareholders only, as follows:

$$\textbf{Return on Common Equity} = \frac{\textbf{Net Income − Preferred Dividends}}{\textbf{Average Common Equity}}$$

The numerator is income available to common shareholders (net income less preferred dividends), and the denominator is total shareholders' equity less preferred equity.

As is average assets, average equity and average common equity are the averages of the beginning and ending values of equity and common equity.